UNITED NATIONS **E**

Economic and Social Council

Distr.
GENERAL

E/CN.17/IPF/1996/6
20 February 1996

ORIGINAL: ENGLISH

COMMISSION ON SUSTAINABLE DEVELOPMENT
Ad Hoc Intergovernmental Panel
on Forests
Second session
11-22 March 1996

SCIENTIFIC RESEARCH, FOREST ASSESSMENT AND DEVELOPMENT OF CRITERIA AND INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT

Programme element III.1 (a): Assessment of the multiple benefits of all types of forests

Report of the Secretary-General

SUMMARY

The present report relates to category III, Scientific research, forest assessment and development of criteria and indicators for sustainable forest management, of the work programme of the Ad Hoc Intergovernmental Panel on Forests (IPF). As requested by IPF at its first session, the report addresses programme element III.1 (a), on assessments of the multiple benefits of all types of forests.

One of the fundamental questions raised concerns the uses and ways to expand the Forest Resources Assessment (FRA) of the Food and Agriculture Organization of the United Nations. It is seen as necessary to distinguish between users and user needs at the national and international levels. The two levels have common characteristics, but each also has its specific requirements and consequently a specific approach to data collection and reporting. While reliable country data are a major input to global assessments, the conclusions of the global assessment, providing country-by-country information, are only of limited use for planning at the national level.

National forest inventories are essential for the preparation and implementation of national forestry action plans and/or programmes. The information needed is specific to each forest site and its current condition

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and to each enterprise and its production goals. It includes data on factors not related to wood production. Besides data collected from forest inventories, long-term experimental observations on the response of forests to various treatments are important. They serve as inputs to model studies for simulating the development of forests under alternative forest management options.

At present the FAO FRA provides global coverage and produces results by country and subnational unit. Only data on country and higher levels are published. More detailed, geo-referenced information is available for scientific purposes.

The results of an inquiry conducted by FAO/ECE in the context of future global assessments shows that most of the developed countries have the capacity to collect, analyse and use data related to traditional forest management oriented towards wood production. Monitoring of change, however, is very uneven from country to country. In the developing countries the existing institutional capacity is either inadequate or too weak to collect and update basic information related to forest coverage and types of forests, species composition, existing growing stock and volume of harvest. A table is provided summarizing the situation at the end of 1990. Although only a few countries are collecting information on the environmental functions of forests and their non-wood benefits, those benefits are well recognized in many countries, and recognition is growing.

The report urges that high priority be given to capacity-building with a focus on the development of national strategies for the management of forests. The work carried out in the forest resources assessment of 1990 should continue in two areas: data collection based on existing reliable country information; and sampling of high resolution satellite date; environmental parameters, including biological diversity, soil and water conservation and vegetation degradation; cooperation with other organizations in order to join resources and share results; and efforts to harmonize concepts, terminology, definitions and classifications.

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INTRODUCTION

1. The Commission on Sustainable Development at its third session established the Ad Hoc Intergovernmental Panel on Forests and outlined its programme of work, which contained five major categories of issues. Under category III, Scientific research, forest assessment and development of criteria and indicators for sustainable forest management, the Panel would "review existing periodic assessments of forests, including relevant socio-economic and environmental factors, at the global level; identify shortfalls in present assessments relative to policy considerations; and recommend practical ways of improving such assessments. Examine ways to broaden the scientific knowledge and the statistical database available in order to better understand the ecological, economic, cultural and social functions performed by all types of forests. Promote the further development of methodologies for properly valuing the multiple benefits derived from forests in the form of goods and services, and subsequently to consider their inclusion within the systems of national accounting, drawing upon work that has been already undertaken by the United Nations and other relevant organizations". 1/

2. At its first session, the Intergovernmental Panel decided that, in consideration of category III, programme element III.1 would entail the preparation of two reports, one of them identifying ways to expand the Forest Resources Assessment (FRA) of the Food and Agriculture Organization of the United Nations (FAO) "with regard to the qualitative and quantitative assessment of all types of forests, including information on biological resources and non-wood forest products and services; information on environmental and social benefits; standardization of tropical and non-tropical data; collection of broader types of forest statistics; coordination of forest monitoring with remote sensing and geographical information systems; the continuous nature of the assessment; and accessibility of information generated to all interested parties". 2/

3. The present report, prepared by FAO, as lead agency for programme element III.1 in consultation with the secretariat of the Panel in the Division for Sustainable Development of the Department for Policy Coordination and Sustainable Development of the United Nations Secretariat, is in response to that decision.

4. In outlining the subject, specific reference is made to the forest resources assessments of FAO and of the Economic Commission for Europe (ECE). However, significant contributions to national and supranational information on forests have been made by numerous other actors. Reference to the work of cooperating organizations is made without attempting, to provide a comprehensive overview of their activities.

I. USES AND USERS OF INFORMATION ON FOREST RESOURCES

5. One of the fundamental questions concerning an expanded FRA is that of the uses and users of the information expected. Assuming that funding for forest resources assessment and monitoring at all levels will remain scarce, strict

prioritization will be necessary. This further underlines the need for prior analysis.

6. There is need to distinguish between the various types of users and user needs at the national and international levels. The two levels have common characteristics, but each also has its specific requirements which dictate a specific approach to data collection and reporting. While reliable country data are a major input to global assessments, the conclusions of global assessments - providing country-by-country information - are only of limited use for planning at the national level.

A. National level

7. The main users of assessment results are national/subnational land use and forestry policy makers and planners, forest managers in the public and private sector and local communities. Their information needs vary according to planning situations, broadly classified as follows:

(a) Strategic forestry planning concerned with issues of general relevance to forestry planning at the national or provincial level and to the sustainable management of forests, taking into account linkages with other sectors. The most demanding information needs in this context may be formulated as follows: What is the level of present and potential production (in a broad sense, including both goods and services) in forests and related lands, compared to the needs? How is it expected to change under alternative forest management programmes and socio-economic regimes? A subsidiary question related to the monitoring of the forests is: What is the effect of implemented policies on forest ecosystems, and in particular, on their productive and renewal capacity?

Since strategic forestry planning has to deal with intra-sectoral issues as well as intersectoral ones such as land use, energy, employment, tribal matters, education, social welfare and environment, the scope of the needed information is wide and includes variables linked with both the production and the consumption (needs) of goods and services derived from forests such as land cover and land use; economic information on forests such as volume, increment and drain; areas suitable for afforestation; species diversity; endangered species; ecological values; traditional/indigenous land-use values; biomass; demographic and socio-economic data affecting forest resources; and need of land for alternate uses such as agriculture and urbanization;

(b) Forest management planning oriented towards local activity. The typical issue is choice of place and time for interventions. The survey intensity is rather high, and mapping - more generally, large-scale geo-referenced information - is essential.

8. The information needed for forest management is specific to each forest site and its current condition and to each enterprise and its production goals. It includes data on various factors not related to wood production. Besides data collected from forest inventories, long-term experimental observations on the response of forests to various treatments are important. They serve as

inputs to model studies for simulating the development of forests under alternative forest management options.

9. In both developed and developing countries, changes in information needs relate mostly to the multifunctional role of forests in general and their environmental functions in particular. The environmental information also has global implications. Continuous research on forest inventory and monitoring techniques is needed in order to expand the scope of forest assessments to cover, in a cost-effective manner, the demand for new information.

10. A wide range of information is now needed for the preparation and implementation of national forestry action plans and/or programmes. National forest inventories constitute a basic tool and contribute to the formulation of effective national strategies for the forestry sector. The term "effective" is important, for it conveys the idea that a sound database is an essential requirement for relating investment to return, production to consumption, and conservation to development, and for ensuring that forest management achieves the goal of sustainability in the widest sense.

B. Global level

11. At the global level the main users of information are:

(a) Planners and policy makers in forestry and related development issues at the global, regional and national levels, including national Governments and intergovernmental organizations;

(b) Public investors like the World Bank, the Investment Centre of FAO, and regional banks. This is a group of international actors who work with countries within the framework of national strategies. They need complete sector-wise data and analyses;

(c) The national and international scientific community, including universities and research institutes. Two types of information needs can be identified: the first related to the question of to what extent forests and related resources can meet sustainably current and future needs of people for goods and services derived from the forest; and the second, to long-term dynamic processes such as deforestation and forest degradation, the impact they have on climate change and biodiversity, and the driving forces behind them. This group will request well-documented information and relatively raw (unprocessed) data;

(d) Certain non-governmental organizations are active as pressure groups or disseminators of information and are therefore important users of forest resources information. To avoid alarmist or misleading awareness campaigns, they need reliable and representative information - e.g., on various forest types (boreal, temperate, tropical, wet, dry, natural, plantations, monocultures);

(e) The general public and media. The need here is to raise awareness and provide objective information on the state of and change in forest and related resources. This group generally requests "digested" information on the main

trends and developments. It requires presentations that are free of jargon and easily understood.

II. OVERVIEW

12. At present FAO's forest resources assessment (FRA) provides global coverage and produces results by country and subnational unit. Only data at the country and higher levels are published. More detailed information, and geo-referenced information, is available for scientific purposes and has potentially high value for such use. A rich potential lies also in intensified use of the data produced, in the use of such data in combination with other data sets, in the furtherance of studies initiated with those data (e.g., fragmentation of the forest cover, loss of biological diversity, changes in biomass), and in improving the reliability of future collections of the type of data collected so far.

13. The methods used in the latest FRA, including the institutional memory and the information networks created around it, could be refined and enlarged for the generation of additional information. That development should, however, be guided by the following principles:

(a) Scientific soundness (e.g., a solid conceptual base, measurability) is a basic requirement for acceptance and credibility;

(b) Usefulness: information for which a clear need has been identified;

(c) Cost-effectiveness.

14. Forest resources information - like the forests themselves - has economic, social, environmental and cultural significance, and spans various sectors of the economy. This implies that inventories - from the local to the global - need to be planned, executed and reported on in a dialogue with stakeholders in all fields concerned.

15. That forest resources information has far-reaching significance can be illustrated with the forest cover change matrices produced by FRA in 1990. By showing the shift of land from one category to another, the matrices help to explain the driving forces behind phenomena such as deforestation and changes in the density and quality of vegetation. At each level, from local to global, such information is valuable for the preparation of measures to counteract undesirable change.

III. EXISTING GAPS IN AVAILABLE KNOWLEDGE AND INFORMATION

16. Programme area D, of chapter 11 of Agenda 21, identifies existing gaps as follows: "Assessment and systematic observations are essential components of long-term planning, for evaluating effects, quantitatively and qualitatively, and for rectifying inadequacies. This mechanism, however, is one of the often neglected aspects of forest resources, management, conservation and development. In many cases, even the basic information related to the area and type of

forests, existing potential and volume of harvest is lacking. In many developing countries, there is a lack of structures and mechanisms to carry out these functions." 1/

17. At the national level a number of key questions with considerable significance for strategic decisions cannot be answered at all, or only partially, or only in some countries. They concern such issues as the consequences of resource management alternatives. Answers would require knowledge of the current state of forests, their capacities to fulfil their functions and their responses to interventions of a policy nature. Such interventions can be information campaigns and/or the development of guidelines, legislation, taxation and subsidies.

18. Two knowledge gaps deserve specific mention:

(a) Direct forest dependency by people, particularly in developing countries, and the dynamics of that dependency;

(b) Availability and the consumption of need for non-wood goods and services derived from forests, and their dynamics.

19. To avoid exaggerated expectations, it must be kept in mind that it is not always lack of information that is the bottleneck factor for improving forest management. Many countries do not have the institutional capacity to design - let alone to implement - strategies for the management of their forest resources. In those cases information alone does not help. Institutional support must be given equal or higher priority.

20. What is not known (but needs to be known) at the international level is more difficult to identify. The uses and users of information need to be more precisely defined. What planning situations exist and where? What are the designs and formulations of development strategies? What type of research needs more and better information to explain the mechanisms and driving forces behind success and failures in resource management? The results produced and experience gained over the years in FAO's forest resources assessment activities will almost certainly need to be complemented, in view of the increasing demands for comprehensive information on forest resources at the national, international and global levels.

21. Supranational issues are those that call for the development of supranational or even global strategies and action programmes in which forest resources information is required for their formulation and implementation. Some of them, along with the gaps in current knowledge, are:

(a) The status of and change in the sustainable wood production capacity of the world's forests, including industrial wood and fuelwood. The global overview of a potential is missing, as is knowledge about actual harvests and needs, to be compared to that potential;

(b) The carbon cycle, which relates to the assessment of biomass. Global estimates were made in 1990 by FRA. However, they must be considered indicative only for certain countries, since the basis of field measurements is very small.

Although measurements of this type are generally costly, good estimates may be all that is needed;

(c) Deforestation and land (vegetation) degradation. Knowledge gaps exist in the understanding of processes and their driving forces and in early warning about the geographical or structural "location" of new deforestation or degradation;

(d) Biological diversity. Limiting factors include unclear concepts and, partly as a consequence, uncertainty about what should be measured and how;

(e) Forest health in the context of transboundary pollution. Basic knowledge is missing as to how to measure health (e.g., the problem of distinguishing symptoms of age or normal climate stress from symptoms of air pollution), since knowledge about cause/effect mechanisms is incomplete.

IV. APPROACHES TO THE ISSUE AND LESSONS LEARNED

22. In order to establish a realistic level of expectations, a distinction must be made between assessment on the one hand, and analysis and use of assessed data, on the other. The two should work closely together, yet they are fundamentally different. Assessment implies (repeated) observations according to defined criteria. Analysis and use of data will try to detect correlations, to find explanations, to valuate (e.g., decide what is good or bad) and draw conclusions as to required action. Thus one should not expect analytical work and extraction of consequences. Moreover, it must be recognized that different levels of precision in data-gathering are required. Although at the local level, a management unit needs considerable details and accurate data, regional and global-level policy makers are more concerned with intermediate and macro-level trends and estimates. New issues regarding forest resources develop continuously. Before assessments can make useful contributions for dealing with such new issues, a number of steps are required, in which various actors are involved and which take considerable time.

A. Experiences

1. National level

23. The multiple benefits of forests and other wooded lands - including urban and peri-urban forests - are well recognized in many countries, and the recognition is growing. However, that recognition does not necessarily lead to a formal assessment of forest resources and/or services. Many countries have focused instead on developing guidelines and management recommendations for different forest ecosystems, based only on already existing quantitative and qualitative knowledge.

24. An inquiry conducted by FAO/ECE on future global assessments shows that most of the developed countries have the capacity to collect, analyse and use data related to traditional forest management oriented towards wood production. Concerning the monitoring of change, however, the achievements so far have been

very uneven. A long tradition exists in practically all developed countries for the conduct of forest inventories for local management planning. Concerning national or provincial forest inventories, the situation also varies, from a long tradition and well targeted and state-of-the-art inventories to very insufficient information. With regard to the environmental functions of forests and their non-wood benefits, only a few countries are currently collecting information, and new efforts have to be made to do so on a large scale.

25. A forest inventory report prepared by FAO shows that in most developing countries the existing institutional capacity is either inadequate or too weak to collect and update basic information on the area and type of forests, species composition, existing growing stock and volume of harvest. The table below summarizes the present situation.

26. Most of the past and ongoing inventory/assessment activities in developing countries have depended on external funding and external expertise. Only a few countries have natural resource inventory institutions with trained personnel and the equipment needed. There is considerable variation among regions with respect to the completeness and quality of the information. There is also considerable variation in the timeliness of the information. The data are about 10 years old, on average, and may therefore not be really representative of the most recent years. Developing countries have not used the most appropriate techniques, such as continuous forest inventory designs, for change assessment, and only a few have reliable estimates of actual plantations, harvest and utilization, although such estimates are essential for national forestry planning and policy-making. No developing country has carried out a national forest inventory containing information that can be used to generate reliable estimates of the total woody biomass volume and change. Finally links with planning and decision-making are generally weak or non-existent; information is produced in isolation from its application. This implies that existing information is poorly used, and insufficient feed-back from users reaches the producers of information.

27. Developing countries have difficulty sustaining the acquired expertise and capacity, for many reasons, including inadequate funding and frequent turnover of staff. The establishment and development of proper national institutions is a basic requirement for action towards sustainable forest resources development.

28. There is now growing recognition in developing countries of the multiple benefits of forests and other associated resources. Many forest inventories have the more or less explicit objective of responding to questions related to those multiple benefits. This has led to increased scope of FRA activities, including attention to monitoring deforestation and change in vegetative cover. There are now also cases of forest inventories that assess quantities of edible fruits, and there are numerous studies of biological diversity for different purposes and using different approaches. Biomass assessment is often an extrapolation of traditional volume assessment.

Table . State of forest inventory in the tropics, 1990

Region	Number of countries under assessment	Number of countries with forest resources data at the national level							
		Forest area information (number of assessments and reference years)				Other topics covered			
		No assessment	One assessment		More than one assessment	Forest conservation and management	Forest plantations	Volume and biomass	Forest harvesting and utilization
			Before 1981	1981-1990					
Africa	40	3	23	12	2	4	8	2	4
Asia and the Pacific	17	0	1	6	10	10	8	7	7
Latin America and the Caribbean	33	0	15	9	9	11	8	9	4
Total	90	3	39	27	21	25	24	18	15

2. International level

29. An assessment of global forest resources is carried out periodically by FAO and ECE, with other national and international organizations contributing to data collection, research and studies either in specific geographical or ecological regions or on specific topics. A database is being prepared by the United Nations Environment Programme (UNEP) describing actors and their activities in the field of assessment of land use/land cover.

30. Many national and international organizations have devoted particular attention to problems of the rainforest and to producing vegetation maps, based on remote-sensing. There are prospects to enhance the usefulness of such activities by making the results of different activities complementary and compatible so that a comprehensive picture can be assembled. An initiative in this direction has been taken by the International Union of Forest Research Organizations.

31. A number of organizations are cooperating with FAO: the Joint Research Centre of the European Commission, on combining low- and high-resolution satellite data; the World Conservation Monitoring Centre, on protected areas; the EROS Data Centre of the United States Geological Survey and NASA Landsat Pathfinder, on providing and screening satellite imagery; the United States Forest Service and the Swedish University of Agricultural Sciences, on technical and statistical methodology; the European Commission, on a comparative study of European forest inventories.

32. However, the potential of coordinating activities and of sharing results is far from being fully met. There are gaps in state and change assessments based on satellite remote-sensing in dry areas with pronounced seasonal variations and in cloud-covered areas. In the developed countries, conclusive forest cover change information is incomplete.

33. The FAO forest resources assessment covering developed countries was able to draw from a relatively rich base of information produced by countries for their own needs. Nevertheless, some important weaknesses do exist: the widely varying quality of country-level data, use of different standards, and lack of secretariat resources to analyse data received and to follow up through the network of country correspondents. As a result, the final reports contain numerous gaps and inconsistencies. Moreover, the results by country do not have a common reference year (which is not considered very serious, since change processes in general are not fast), and the information collected is not presented on maps.

34. For developing countries, both the collection and the compilation of basic data are carried out at FAO. The focus, in the last two rounds of assessment (1980 and 1990), has been on change detection and on world-wide comparability. Considerable progress has been made in these fields, but comparability between developed and developing countries still needs improvement. FAO also makes the global synthesis. In the assessment of 1990 for developing countries the compilation of data was centralized at FAO and conducted by using a team of experts and consultants. This was made possible with the help of external budgetary resources in addition to FAO regular programme contributions.

35. For the tropical developing countries, in addition to the assessment based on an analysis of country data, a supplementary approach was used. In the entire tropical zone, systematic observations of forest cover and deforestation were made on a sample of multidate high resolution satellite data. This design provides information at regional and global levels on the process of change in the form of a change matrix which has relevance for land use and forest policy planning and which satisfies rather well the requirements of the scientific community in respect of objectivity, reliability and continuity of observations. For the first time at such large scale, it answers the question of what happens to the land that is deforested, and it gives a new type of information regarding the process of vegetation degradation and recovery, by showing class-to-class changes for eight land cover classes.

36. The remote-sensing/sampling approach is also expected to supplement the general lack of multidate information on forest cover in the developing countries. It has been possible, through this approach, to confirm the findings of the assessment based on an analysis of existing country information regarding state and change of forest area.

B. Support to developing countries

37. A review of field projects in forest resources assessment, carried out by FAO since 1980, shows that all the projects had an impact in generation information but that only a few contributed to building long-term capacity and none to establishing an institutional frame for effective use of forest resources information. In those cases where a lasting impact was produced, the key to success was continued involvement with the concerned institutions spread over a long period of time. In all cases, a necessary condition was governmental commitment to maintaining and developing the institution after termination of a project.

38. Forest resources assessments make use of fast-growing technology such as digital remote-sensing techniques, geographic information systems, communication net-working etc. There have been quite a few shortcomings in the transfer of technology not well adapted to the new environment. Increased South/South cooperation could provide access to very useful information and ensure that appropriate technology is used.

39. The most important limitation associated with the current field programme of FAO and, presumably, other organizations lies in the fact that technical assistance is provided on request only and does not form an integral part of a long-term strategy for developing institutional and human resources or generating self-reliance, as envisaged in Agenda 21. As a result, although technical assistance has been provided to member countries for over 50 years, the existing capacity, as discussed above is rather weak. There is need for countries and their cooperating partners to work together and agree on general criteria to be applied in the selection, formulation and implementation of short-term projects within the framework of national policies, strategies and plans. This should take into account the existing relevant international organizations, mechanisms and commitments.

C. Lessons learned at the international level

40. For the developed countries, potential for improving the ECE/FAO assessments lies in a better use of country correspondents and more intensive cooperation so that the work of other actors can be used. The former will ensure that available country information is fully used and correctly converted into common standards. The latter can lead to progress in the utilization of, for example, map information and in the assessment of new parameters.

41. For the developing countries it is considered a major achievement that the state and change of forest cover can be estimated with a level of accuracy that allows valid conclusions at least for subregions such as West Sahelian Africa and Insular South-east Africa. Results from the remote-sensing-based sampling have contributed essential new information in the form of change matrices. They have also confirmed that the methods based on existing reliable country data are robust.

42. Substantial improvements in the results require increased country capacity, above all for the needs of the developing countries themselves. This must be accompanied by enhanced institutional capacity for the planning and implementation of forest management programmes.

43. The synthesis at the global level has met with difficulties due to differences in concepts and definitions. The definition of "forest" is not the same in developed and in developing countries. Information on area change in developed countries was assessed for the total of "forest and other wooded land", while in developing countries the emphasis is on the category of forest, changes in other wooded land being less accurately assessed. There is wide recognition of this discrepancy, and work is under way to achieve compatibility for the core information. It must be recognized, however, that full comparability of categories may be meaningless, since nature is so different in

the different climate zones of the earth. The priority assigned to assessing parameters such as species richness and "naturalness" is expected to remain low in many developing countries in the foreseeable future.

V. FUTURE TRENDS AND PRIORITIES

44. Indications from the processes, initiatives and discussions undertaken since the United Nations Conference on Environment and Development point to the need to describe the quality of forest management, particularly by the progress made towards sustainable forest management, and to give increased attention to capacity-building with a focus on the development of national strategies for the management of forests and the use of forest resources information. In both cases increasing emphasis is given to aspects of the multifunctionality of forests. Within the assessment programme of ECE and FAO, progress has already been made in some "hot spots", but additional work on concepts and methods is required - for example, on biomass in the global carbon cycle, biological diversity, and forest degradation.

45. Dissemination of information is becoming an increasingly critical factor in a world where more and more groups make themselves heard in national and international debates on issues related to forestry.

46. It is suggested that high priority be given to the following activities and developments:

(a) Capacity-building and long-term maintenance, with a focus on the development of national strategies for the management of forests;

(b) Continuation of the work carried out in the forest resources assessment of 1990, with two components: data collection based on existing reliable country information, and sampling of high-resolution satellite data. The two components have proved to be a cost-effective combination for the collection of relevant and reliable base information. The value of statistically linking the two approaches is yet to be exploited;

(c) Environmental parameters, including additional work on concepts, terminology (working definitions) and methods and on the actual assessment, with a focus on the above-mentioned "hot spots" - biomass, biological diversity and forest degradation, plus soil and water conservation;

(d) Cooperation with other actors in order to join resources and share results. There are prospects for progress in particular in the field of remote-sensing, where a need has been identified to produce, among other things, vegetation maps with world-wide coverage and reliable and internationally comparable forest cover change information for developed countries;

(e) Efforts to harmonize concepts, terminology, definitions and classifications.

VI. ISSUES FOR FURTHER CONSIDERATION

47. The Panel may wish to identify issues that need to be given special attention:

(a) The lack of basic information. This calls for capacity-building in information-gathering to be integrated with capacity-building in strategic planning and decision-making;

(b) A study, at the international level, of the uses and users of forest resources information. This is particularly important when new types of information to be included in the FAO forest resources assessment are discussed;

(c) Intensified use of data already available, for example, in the databases and archives of the FAO forest resources assessment. Those data, in combination with other data sets and studies based on them, in response to user needs, can be used to respond to questions of urgency in a cost-effective way;

(d) Improving the capacity of countries with special problems, notably countries in transition. This will address a deficiency with regard to the quality of certain international information and will assist those countries in creating a better basis for strategic planning at the national level;

(e) The establishment and development of proper national institutions. Forest resources assessment can be useful only if the necessary institutions to use the information produced are in place;

(f) The integration of indicators for sustainable forest management into forest resources assessments. This means that indicators must be quantifiable and measurable, that the assessment of such indicators can be integrated in a cost-effective manner, and that adequate funding must be provided;

(g) Research on forest inventory and monitoring techniques to expand the scope of forest assessments to cover, in a cost-effective manner, the demand for new information;

(h) Mobilization of funding. Due consideration should be given to the fact that the costs for forest inventory make up a minute fraction of the actual or potential revenues from forests;

(i) Coordination of efforts at the international level. There is readiness among actors to contribute to common products. International activities such as the Global Terrestrial Observing System and the International Geosphere-Biosphere Programme are examples of existing cooperation. Findings could enhance global assessments. However, the technical and practical obstacles must not be underestimated;

(j) Dissemination of information to those countries and stakeholders that have difficulties in accessing internationally available information.

Notes

1/ Official Records of the Economic and Social Council, 1995, Supplement No. 12 (E/1995/32), para. 204, annex I, part III.III.

2/ E/CN.17/IPF/1995/3, para. 18.

3/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992 (A/CONF.151/26/Rev.1 (Vol. I and Vol. I/Corr.1, Vol. II, Vol. III and Vol. III/Corr.1)) (United Nations publication, Sales No. E.93.I.8 and corrigenda), vol. I: Resolutions adopted by the Conference, resolution 1, annex II, chap. II, para. 11.29.